U.S. Geological Survey (USGS) Maryland-Delaware-District of Columbia
Monthly Water Conditions Summary

April 2015 Highlights: Seventy-eight percent of groundwater and 94 percent of streamflow levels were normal at sites monitored by the U.S. Geological Survey across Maryland, Delaware, and the District of Columbia.

Why is it important for the USGS to collect and analyze water-resources data?

USGS water data are valuable to the public, researchers, water managers, planners, and agricultural users, especially during floods and droughts. These data can be used to assess how water resources respond to changes in climate. Scientists at the USGS have measured streamflow and groundwater levels to assess water resources for over 125 years.

In addition to providing the most extensive set of historical streamflow and groundwater data available to the public, the USGS continues to collect water data and quality-assures the data using standardized techniques across the country. The uniformity of the dataset enables multi-state comparisons and other comparative statistical analyses that better inform policy makers of the possible water-resources conditions they might encounter in the future.

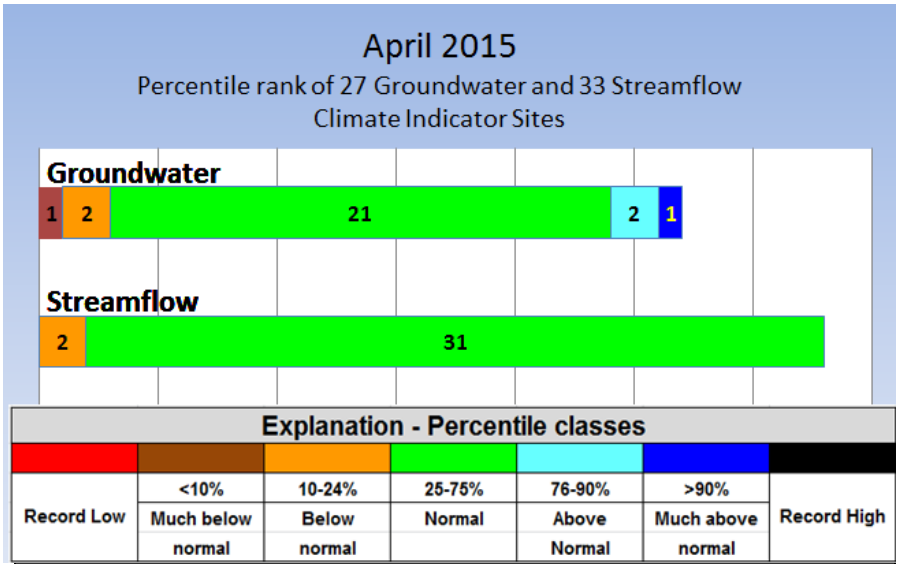
The sites used in this water summary were carefully selected to show the response of streamflow and groundwater levels to weather conditions. Ideally, these sites will show no effects from human influences. The streamflow and groundwater data are ranked in comparison to the historical record and summarized. Precipitation and reservoir data are also presented to give a more complete picture of the region's water resources.

USGS April 2015 Water Conditions Summary

Seventy-eighty percent of the groundwater levels and 94 percent of the streamflow levels were normal (between the 25th and 75th percentiles) at sites used to monitor the response of water resources to changes in climatic conditions in Maryland, Delaware, and the District of Columbia.

Groundwater levels were normal in 21 of 27 USGS monitoring wells. Of the remaining six wells, groundwater was above normal in three wells and below normal in three wells.

April monthly mean streamflows were normal at 31 of the 33 streamgages. Streamflow was below normal at the remaining two streamgages – one in Delaware and one in Maryland.



A **percentile** is a value on a scale from 0 to 100 that indicates the percent of a distribution that is equal to or below it. A percentile between 25 and 75 is considered normal. For example, a groundwater level in the 90th percentile is equal to or greater than 90 percent of the values recorded for that month.

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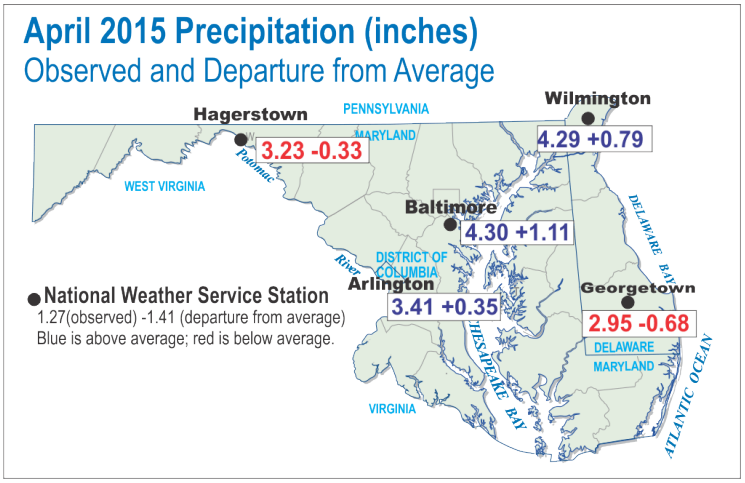
April 2015 Precipitation and Weather

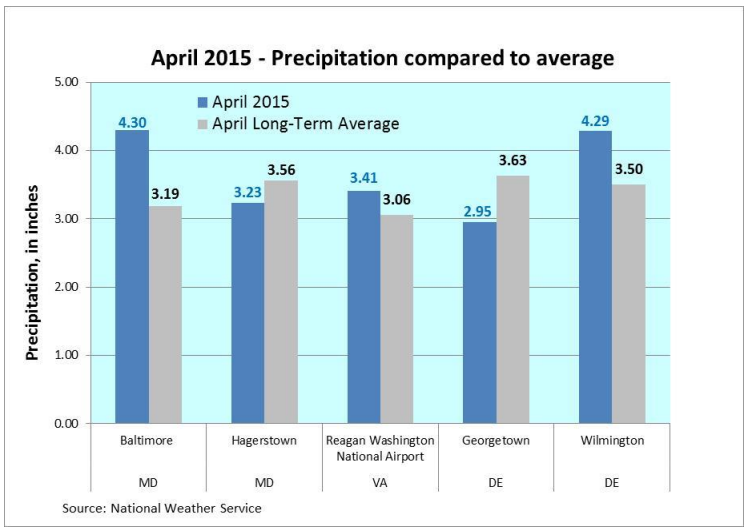
April precipitation ranged from 0.68 inches below to 1.11 inches above the long-term average at the five National Weather Service (NWS) Mid-Atlantic weather stations. The highest amount of monthly precipitation was in Baltimore, Maryland, with 4.30 inches, and the lowest was in Georgetown, Delaware with 2.95 inches.

National Weather Service Stations

Baltimore =
Baltimore/Washington International Thurgood Marshall Airport (BWI)
Georgetown =
Georgetown, Sussex County Airport
Hagerstown =
Hagerstown Regional Airport
Arlington =
Ronald Reagan Washington National Airport
Wilmington =
New Castle Airport



The NWS Middle Atlantic River Forecast Center's (MARFC) 365-day precipitation data for Maryland, Delaware, and the District of Columbia showed that all counties except for Garrett County, Maryland were in the normal range at the end of April. Precipitation ranged from below average to average, with 22 of the 23 counties in Maryland and all 3 counties in Delaware in the normal range. See the links below to view the NWS MARFC data.



April air temperatures were above the long-term average at all five NWS Mid-Atlantic weather stations ranging from 0.7 to 2.6 degrees Fahrenheit above average. In April, the temperature in Wilmingtown, Delaware averaged 54.0 degrees Fahrenheit, the lowest of the five weather stations for the second consecutive month. Typically, the average temperatures are colder in western Maryland than in Delaware.The warmest April average temperature was 59.4 degrees Fahrenheit in Arlington, Virginia near the District of Columbia.

Sources: National Weather Service and Middle Atlantic River Forecast Center (MARFC)
MD and DC: http://www.weather.gov/climate/index.php?wfo=lwx
DE: http://www.weather.gov/climate/index.php?wfo=phi:
MARFC http://www.erh.noaa.gov/marfc/Precipitation/Departures/

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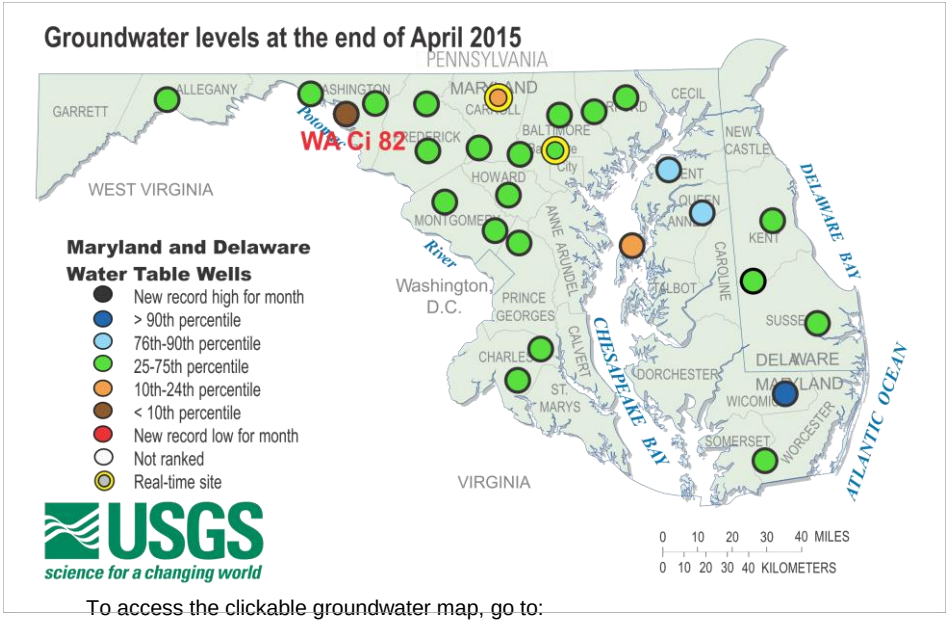
Groundwater

The USGS monitors groundwater levels in unconfined aquifers, providing observations that can be compared to both short-term and long-term changes in climatic conditions. Twenty-seven groundwater wells were selected based on the following criteria:

- Located in an unconfined (water-table) aquifer;
- Open to a single, known hydrogeologic unit/aquifer;
- Groundwater hydrograph reflects changes in climatic conditions;
- No indicated nearby pumpage and likely to remain uninfluenced by pumpage, regulated streamflow, or changes related to human activities;
- Minimum period of record is 10 years of continuous/monthly records;
- Minimally affected by irrigation, canals, drains, pipelines, and other potential sources of artificial recharge;
- Well has a casing – dug wells are generally not used;
- Water levels show no apparent hydrologic connection to nearby streams;
- Well has never gone dry; and
- Long-term accessibility likely.

April 2015 Groundwater Levels

April groundwater levels were normal (between the 25th and 75th percentiles) in 21 of the 27 USGS wells used to monitor climatic conditions in Maryland and Delaware. Groundwater levels in two observation wells in Kent and Queen Anne's Counties in Maryland were between the 76th and 90th percentiles, and the groundwater level in an observation well in Wicomico County, Maryland was above the 90th percentile. Groundwater levels were below normal (between the 10th and 24th percentiles) in Carroll and Queen Anne's Counties, in Maryland, and below the 10th percentile in well WA Ci 82 in Washington County, Maryland. The groundwater levels in the three USGS observation wells in Delaware were all in the normal (between the 25th and 75th percentiles) range.



To access the clickable groundwater map, go to:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties/

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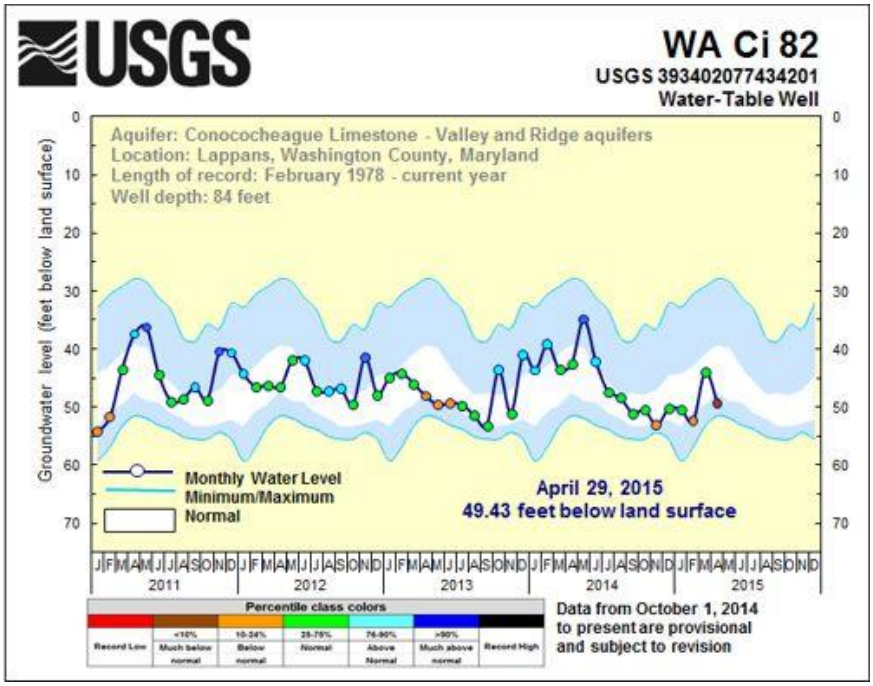
In Washington County, Maryland, the groundwater level in USGS observation well WA Ci 82 was 49.43 feet below land surface, which is below normal (<10th percentile).



Five-year groundwater hydrographs can be viewed at:
http://md.water.usgs.gov/groundwater/web_wells/current/water_table/counties

The 5-year hydrograph shows groundwater levels as a dark blue line, the minimum and maximum monthly values, and the normal range (between the 25th and 75th percentiles) as a white band based on the period of record. The maximum water level is at the top of the upper blue section and the minimum water level is at the bottom of the lower blue section in the graph. Each monthly measurement is colored according to the percentile rank in which it falls for the month.

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Streamflow

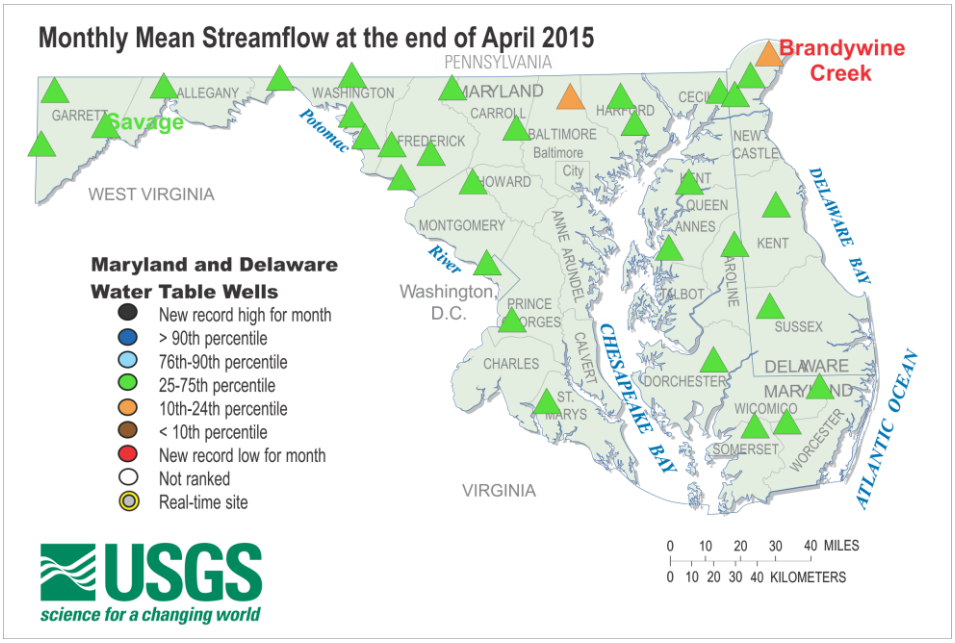
Streamflow data are used for many purposes. A few of the most common uses are to assess water supply and the risk of droughts and floods. Streamflow data are also used to calculate loads of chemical constituents and assess how biological communities are affected by hydrologic conditions. The USGS operates the most extensive network of streamgages in the region.

The streamflow locations chosen for the monthly water summary were selected based on the following criteria:

- Minimum period of record is 10 years of continuous data;
- Watershed areas greater than 5 square miles;
- Streamflow is not regulated, or has relatively natural flow;
- Streamflow data reflect climatic conditions; and
- The surrounding area and watershed are not urban.

April 2015 Streamflow

April monthly mean streamflows were all in the normal range (between the 25th and 75th percentiles), except at two USGS streamgages used to monitor climatic response in Maryland, Delaware, and the District of Columbia. Streamflow was normal at 31 of the 33 USGS streamgages, and between the 10th and 24th percentiles at 2 USGS streamgages: Brandywine Creek at Wilmington, Delaware (01481500) and Little Falls at Blue Mount, Maryland (01582000).



To access the clickable streamflow map, go to:
http://md.water.usgs.gov/surfacewater/streamflow/

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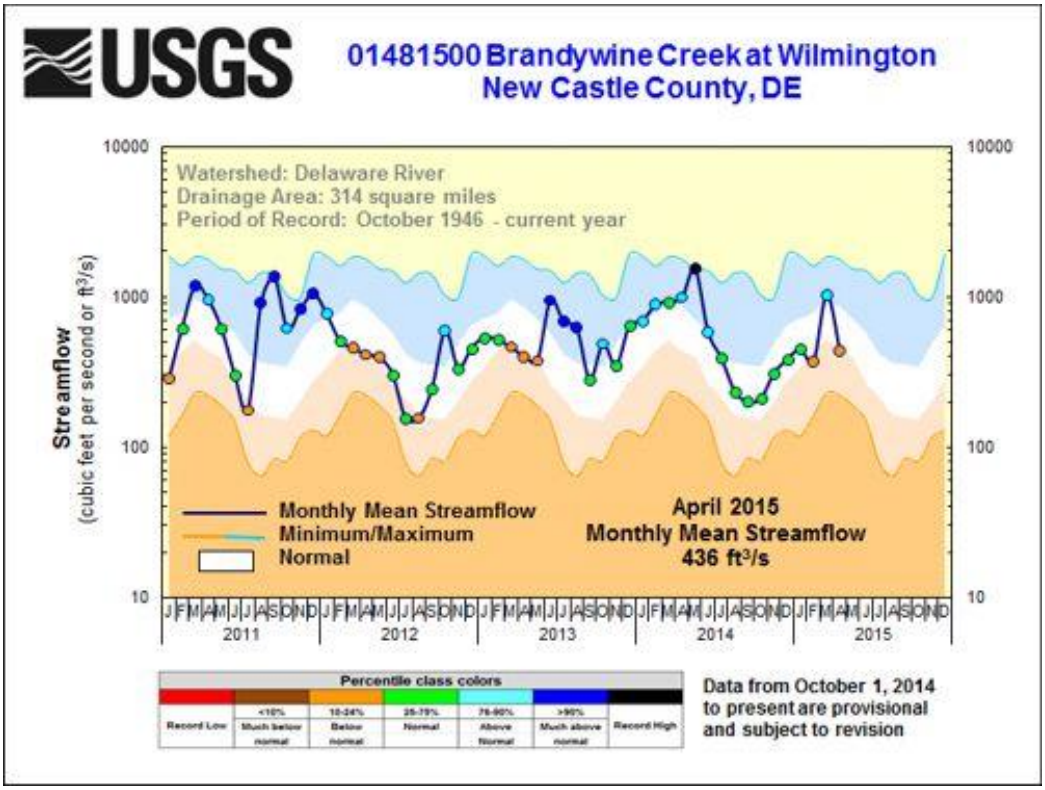
The monthly mean streamflow on Brandywine Creek at Wilmington, Delaware dropped from above normal in March to below normal in April 2015. The monthly mean streamflow typically begins to fall at this time of year with the average peak in March, but the drop in April was much steeper than the normal trend.



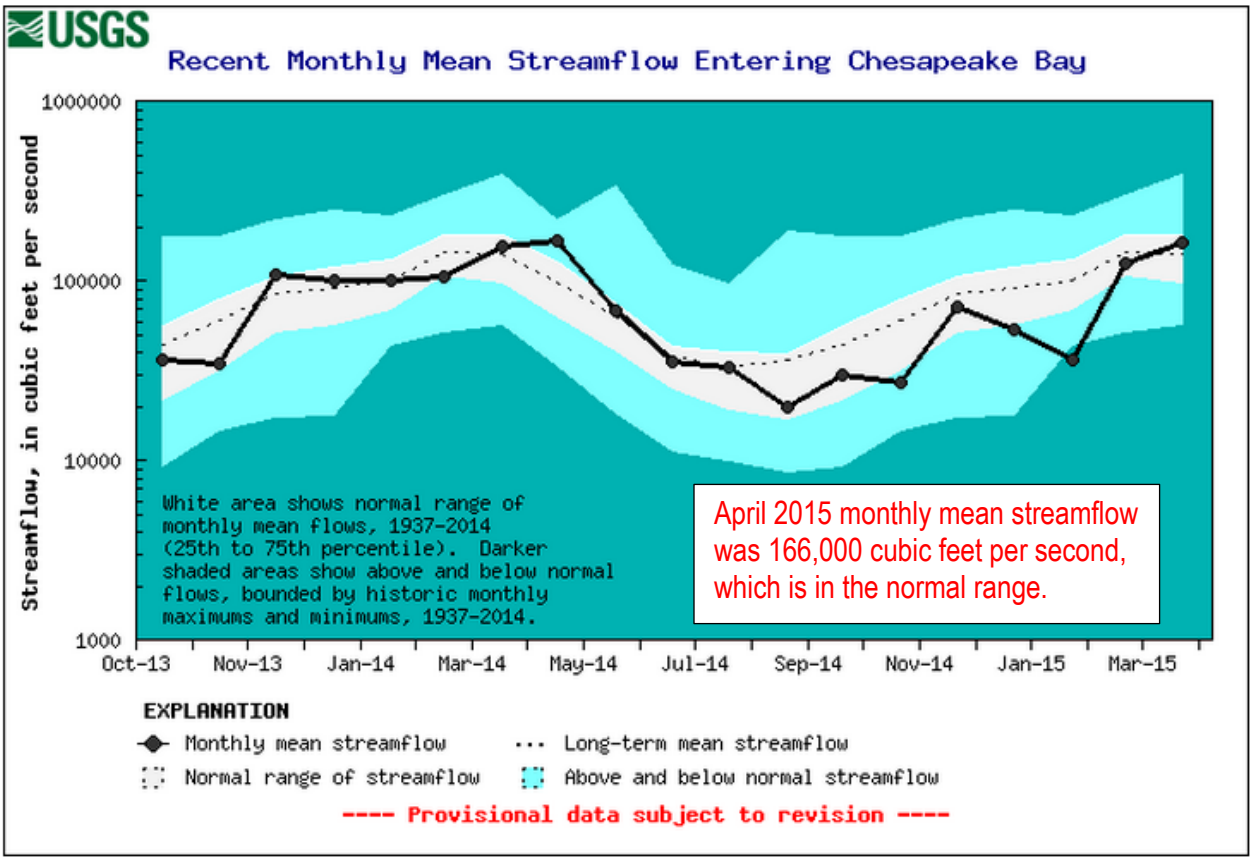
Five-year hydrographs can be viewed at:
http://md.water.usgs.gov/surfacewater/streamflow/

The dark line in the 5-year hydrograph represents the monthly mean streamflow for this period and the white band shows the normal range (25th to 75th percentiles) based on the period of record. The maximum monthly mean streamflow is at the top of the blue shaded section, and the lowest monthly mean streamflow is at the top of the dark orange area. Each monthly mean measurement is colored according to the percentile rank in which it falls for the month.

Estimated Streamflow to the Chesapeake Bay

The USGS estimates monthly mean freshwater streamflow to the Chesapeake Bay using streamflow measurements from the Susquehanna, Potomac, and James Rivers. In April 2015, the monthly mean freshwater flow to the Chesapeake Bay was 166,000 cubic feet per second (ft^3/s; provisional, and subject to revision) which is above the long-term April average (mean) of 143,000 ft^3/s, but within the normal range between 95,700 ft^3/s and 179,000 ft^3/s, the 25^{th} and 75^{th} percentiles of all April values. These provisional statistics are based on a 78-year period of record.

Runoff in the Chesapeake Bay watershed carries pollutants, such as nutrients and sediment, to rivers and streams that drain to the Bay. The amount of water flowing into the Chesapeake Bay from its tributaries has a direct impact on how much pollution is in the estuary and it also affects the salinity levels that are important for fish, crabs, and oysters. Generally, as river flow increases, it brings more nutrient and sediment pollution to the Bay.



More information on the freshwater flow to the Bay can be found here:
http://md.water.usgs.gov/waterdata/chesinflow/

Reservoir Levels

Available reservoir storage at the end of April 2015 in the Baltimore reservoirs (Loch Raven, Liberty, and Prettyboy) was 100 percent of available storage capacity, or a total of 75.77 billion gallons of water. The Baltimore City Environmental Services Division manages the Baltimore reservoirs.

Total normal storage in the Triadelphia and Duckett Reservoirs, which serve parts of Howard, Montgomery, and Prince George's Counties in suburban Maryland around the District of Columbia, was 99.70 percent of normal storage capacity at the end of April 2015, with 10.59 billion gallons of water. Not all of the water in the Patuxent Reservoirs is usable; for operational purposes, percent of normal storage capacity is used, but this value can exceed 100 percent of the usable storage. The Washington Suburban Sanitary Commission (WSSC) manages the Patuxent reservoirs.

April 2015	Percent available/normal storage	Volume (billion gallons)
Baltimore Reservoirs Baltimore City – Environmental Services Division		
Liberty	99.78%	36.72
Loch Raven	100.00%	21.20
Prettyboy	100.00%	17.85
Total	100.00%	75.77
Patuxent Reservoirs Washington Suburban Sanitary Commission (WSSC)		
Triadelphia	101.41%	5.68
Duckett	97.98%	4.91
Total	99.70%	10.59